

The foregoing disclosure and description of the invention are illustrative and explanatory thereof, and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made without departing from the spirit of the invention.

I claim:

1. A pressure-boosting apparatus in combination with a downhole tool and operated by a wireline-powered down-hole pump, comprising:

a pressure-actuated downhole tool operably connected to a wireline-powered downhole pump;

said pressure-boosting apparatus in flow communication with said downhole pump, and further comprises:

a body having an inlet to receive a pressure source and an outlet connected to the downhole tool;

a piston movably mounted in said body, said piston having opposed faces of dissimilar cross-section;

said piston comprises a towpath therethrough to allow, at least for a time, flow through said flowpath to the downhole tool to initiate its operation without piston movement, whereupon the creation of an unbalanced force on said piston due to said flow through said towpath, said piston is urged to move toward said downhole tool;

said flowpath further comprises a check valve which allows flow toward said downhole tool until sufficient movement of said piston toward said downhole tool forces said check valve to close, which results in the pressure applied to said inlet being magnified at said outlet of said body and said downhole pump to thereby allow said pump, due to said pressure magnification, to produce sufficient pressure to fully operate said downhole tool.

2. The apparatus of claim 1, wherein:

said check valve is operable responsively to pressure on said check valve resulting from movement of said piston.

3. The apparatus of claim 2, wherein:

said check valve is automatically actuated to a closed position upon movement of said piston toward the downhole tool.

4. The apparatus of claim 3, wherein:

said check valve is opened upon application of said first pressure to said inlet.

5. The apparatus of claim 4, wherein:

said valve is biased closed until application of said first pressure at said inlet.

6. The apparatus of claim 5, wherein:

said valve comprises a seat coupled with a spring-loaded ball.

7. The apparatus of claim 6, wherein:

said spring keeps said ball against said seat until said first pressure is applied at said inlet, whereupon said ball is driven off said seat; and upon a subsequent application of a force of a predetermined value on said piston, said piston moves to assist in actuation of the downhole tool;

said spring reseats said ball on said seat as movement of said piston increases pressure on the downhole tool, which tends to move said ball to said seat.

8. The apparatus of claim 7, wherein:

said piston is initially retained to said body unit application of said first pressure creates a sufficient force to break loose said piston to allow it to accelerate.

9. The apparatus of claim 7, further comprising:

a biasing member acting on said piston upon removal of said first applied pressure to restroke said piston toward said inlet to facilitate reuse of the apparatus without removal from the wellbore.

10. The apparatus of claim 1, wherein:

said piston is initially retained to said body until application of said first pressure creates a sufficient force to break loose said piston to allow it to accelerate.

11. The apparatus of claim 10, wherein:

said check valve is opened upon application of said first pressure to said inlet.

12. The apparatus of claim 11, wherein:

said check valve is biased closed until application of said first pressure at said inlet.

13. The apparatus of claim 12, wherein:

said check valve comprises a seat coupled with a spring-loaded ball.

14. The apparatus of claim 13, wherein:

said spring keeps said ball against said seat until said first pressure is applied at said inlet, whereupon said ball is driven off said seat; and upon a subsequent application of a force of a predetermined value on said piston, said piston moves to assist in actuation of the downhole tool;

said spring reseats said ball on said seat as movement of said piston increases pressure on the downhole tool, which tends to move said ball to said seat.

15. The apparatus of claim 1, further comprising:

a biasing member acting on said piston upon removal of said first applied pressure to restroke said piston toward said inlet to facilitate reuse of the apparatus without removal from the wellbore.

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